

REMARKS

The claims have been amended to resolve an issue raised by the Examiner under 35 U.S.C. 112, second paragraph.

Entry of the amendment is respectfully requested.

Obviousness Rejections

On page 3 of the Office Action, in paragraph 4, claims 1, 3-5, 8, 11, 12, 23, 24, 26-30, 32, and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lammon (Pub No 2003/0042643) in view of Jourquin et al. (PN 5662996). Also, on page 8 of the Office Action, in paragraph 5, claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lammon (Pub No 2003/0042643) in view of Jourquin et al. (PN 5662996) as applied to claim 8 above, and further in view of Takahashi et al. (PN 4904429). In addition, on page 9 of the Office Action, in paragraph 6, claims 13, 16, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lammon (Pub No 2003/0042643) in view of Jourquin et al. (PN 5662996) as applied to claim 1 above, and further in view of Shockey (PN 3516117).

In response, Applicants note initially that in the method according to the present invention, as elected with the previous reply, the flexible skin layer is made by spraying a liquid reaction mixture against a first mould half, the rigid substrate layer is made by spraying a further liquid reaction mixture against a second mould half and an intermediate layer, in particular a foam layer, is produced between the skin and the substrate by applying a curable material therebetween so that the skin and the substrate are adhered to one another.

In the method of Lammon, the skin layer is also made by a spray process and the skin layer and the substrate layer are adhered to one another by means of a curable material producing an intermediate foam layer between the skin and the substrate layer.

The inventive feature distinguishing the present invention from the method of Lammon is that in the reference US published patent application the substrate layer is made by an injection moulding process (wherein molten thermoplastic materials are injected under a high pressure in a closed mould) whilst in the method according to the present invention the substrate layer is made by a spray process wherein a reaction mixture is sprayed against a mould surface.

As to the non-obviousness of the use of a spray process for producing the substrate against the second mould surface instead of the high pressure injection moulding process used by Lammon, Applicants refer first of all to page 4, line 7 – page 5, line 2 of the present patent application. As far as Applicants know, the method of Lammon has moreover never been used in practice. In Applicants' opinion, this is due to the fact that the method of Lammon offers major problems. These problems are essentially based on the fact that the injection moulding apparatus enables to achieve a high output due to the fact that the molten thermoplastic material can quickly be cooled down to solidify and can thus be quickly removed from the mould. The backfoaming process (i.e. the production of the intermediate foam layer) and the skin producing process, requires however a much longer cycle time since the required curing of the reactive mixtures takes a much longer time. The very expensive injection moulding apparatus can thus not be optimally used and is most of the time inoperative.

Lammon has also recognized this problem and has proposed in paragraph [0041] of his US patent application publication No. 2003/0042643 to increase the efficiency of the method by providing a plurality of main moulding presses (backfoaming moulds) for one single injection

moulding device. However, such a solution also offers major disadvantages. First of all, all of the second mould halves which are both used in the backfoaming apparatus and in the injection moulding apparatus have to be constructed very rigidly to withstand the high pressures of the injection moulding process. For producing one type of trim part, several expensive second mould halves are thus required. In practice the installation has to be used for producing different types of trim parts. Consequently, for each type of trim part a whole series of first and second mould halves (backfoaming moulds) have to be provided to be able to use the injection moulding apparatus effectively. The thus achieved production capacity would however be too high and/or too high investments would be required.

In the method according to the present invention, these problems are solved by producing the substrate in accordance with a spray process. In that way, the second mould halves which are also used in the backfoaming process do not need to be made more solid than required for the backfoaming process. The method according to the present invention also does not require an expensive injection moulding apparatus. It even requires no additional “third” mould half to produce the substrate since the substrate is produced by spraying a reaction mixture against the second mould half.

In the method of Jourquin (US 5662996) the skin layer is first produced by spraying a reaction mixture against a mould surface, subsequently the intermediate foam layer is produced by spraying a foamable reaction mixture against the back of the skin and finally the substrate layer is produced by spraying a further reaction mixture against the back of the intermediate foam layer. A drawback of this method is that the spray process does not allow one to produce a substrate layer having an accurately defined back surface. The back of the sprayed substrate layer has thus to be finished further in order that the composite trim part can be mounted

correctly in the car body. In order to avoid this finishing step, Jourquin proposes an alternative method wherein, after having sprayed the skin layer and the intermediate foam layer, the mould is closed and the reaction mixture for the rigid substrate layer is injected in the space between the intermediate foam layer and the surface of the second mould half (see col. 2, lines 27 – 41 and col. 4, lines 57 – 63).

Compared to the method of Lammon, this alternative method of Jourquin offers the advantage that only two mould halves are needed in order to produce a trim part with a finished back surface. Also the present invention is directed to a method wherein not only the front surface (skin) of the trim part is perfectly finished but also the back side of the trim part (= back side of the substrate).

An important drawback of the method of Jourquin is however that the three layers of the trim part are produced in three successive steps, one after the other (see for example col. 1, lines 41 – 49 and col. 3, lines 31 – 39), and this each time starting from a reaction mixture which has to be allowed to cure before the next layer can be applied. Each step may thus take a few minutes so that the production of one trim part requires several minutes.

In the method according to the present invention, the cycle time is considerably reduced compared to the method of Jourquin without requiring however a very expensive injection moulding installation as disclosed by Lammon. This reduced cycle time is achieved in the method according to the present invention by the fact that the skin layer as well as the substrate layer are simultaneously sprayed and cured against the surface of the first and respectively the second mould half.

Based on the teachings of Lammon and Jourquin, Applicants submit that a skilled person would not arrive at all at the method according to the invention, so that this method is not obvious.

For a skilled person it is important that the produced trim part has a finished back side so that it can be correctly mounted to the car body. Such a perfectly finished back side is achieved in the method of Lammon, but as explained hereabove, this method requires a very expensive installation. A perfectly finished back side is also achieved in the alternative embodiment of Jourquin wherein the substrate layer is produced by a RIM (Reaction Injection Moulding) process against the back of the intermediate foam layer. An advantage of this method is that it requires only two mould halves which are moreover less expensive than in the method of Lammon since they have to resist much smaller pressures. Based on the teachings of Lammon and Jourquin, a skilled person would thus produce the substrate layer by a RIM process against the back of the intermediate foam layer.

Although Jourquin discloses that the rigid substrate can be made by spraying the reaction mixture on the back side of the intermediate foam layer, there is no clue at all in Jourquin to spray it on the second mould surface. The present inventors have however found that by spraying the substrate making mixture against the second mould half surface, a trim part with a perfectly finished front side and a perfectly finished back side can be produced with a moulding installation, which is much cheaper than the moulding installation of Lammon and which comprises only two mould halves instead of three, moreover in a considerably shorter cycle time than in the method of Jourquin. Consequently, even when combining the teachings of Lammon and Jourquin, a skilled person would not have arrived at the method according to the present invention.

Accordingly, Applicants submit that the present invention is not obvious over Lammon in view of Jourquin. Further, Applicants submit that the other art cited by the Examiner does not make up for the deficiencies of Lammon in view of Jourquin as discussed above. Thus, Applicants submit that the present invention is not obvious over the cited art combinations, and withdrawal of these rejections is respectfully requested.

Rejection under 35 U.S.C. 112, Second Paragraph

On page 11 of the Office Action, in paragraph 8, claims 9, 10, 11, 17, 23, 24, 26, 27, 28, 29, 30, 32, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite due to the recitation of the word "preferably" in claims 9, 11, 17, 23, 28, 29, 30, and 32.

In response, and to expedite allowance, Applicants have deleted "preferably" from claims 9, 11, 17, 23, 28, 29, 30, and 32 as identified by the Examiner. Accordingly, Applicants submit that this rejection has been overcome, and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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Respectfully submitted,



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